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CLAIMS:

1. A DNA sequence coding for oncofetal ferritin 1 (OFF1) protein selected from the group consisting of:

- (i) a DNA sequence as depicted in Fig. 1;
- (ii) a DNA sequence as depicted in Fig. 4;
- (iii) a DNA sequence which codes for the same amino acid sequences of (i) or (ii);
- (iv) fragments of any of the sequences of (i) to (iii) that code for a physiologically active protein;
- (v) a DNA sequence that has at least 80% homology, as determined by hybridization under stringent conditions, to any one of the sequences of (i) to (iv) and code for a physiologically active protein; and
- (vi) a DNA sequence that hybridizes to the sequences of (i) or (iv), under highly stringent conditions, being hybridization to filter-bound DNA in 0.5M NaHPO₄, 7% sodium dodecyl sulfate (SDS), 1mM EDTA at 65°C, and washing in 0.1xSSC/0.1% SDS at 68°C, which can either be used as a probe for OFF1, or which encodes functionally equivalent gene product; and
- (vii) a DNA sequence that hybridizes to the sequences of (i) to (iv) under moderately stringent conditions, e.g., washing in 0.2xSSC/0.1% SDS at 42°C yet which still encodes a functionally equivalent gene product.

- 2. An expression vector comprising the DNA sequence of Claim 1.
- 3. An expression vector according to Claim 2, being a plasmid.
- 4. A genetically engineered host cell containing the DNA sequence of Claim 1, operatively associated with a regulatory element heterologous to the

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DNA sequence which directs the expression of the DNA sequence by the host cell.

5. An amino acid sequence coded by the nucleic acid sequence of Claim 1.

5 6. A DNA sequence which is complementary to at least a portion of any one of the sequences of Claim 1, capable of being transcribed to mRNA which is an anti-sense to at least a portion of the mRNA transcribed by any one of the sequences of Claim 1, said portion being sufficient to inhibit translation of the mRNA to protein.

10 7. An anti-sense mRNA sequence transcribed from the DNA of Claim 6.

8. A pharmaceutical composition comprising the expression vector of Claim 3.

15 9. A pharmaceutical composition comprising the amino acid sequence of Claim 5.

10. A pharmaceutical composition according to Claims 8 or 9, for immunization against cancer.

11. A pharmaceutical composition according to Claim 10, for immunization against breast cancer.

20 12. A pharmaceutical composition according to Claims 8 or 9, for the treatment of transplant rejections, autoimmune diseases, pathological pregnancies and for enhancing fertilization rates during IVF treatment.

13. A pharmaceutical composition according to Claims 8 or 9 for use as a growth factor of bone-marrow progenitor cells.

25 14. A pharmaceutical composition according to Claim 13, wherein the cells are granulocyte monocytes.

15. A growth factor for bone marrow progenitor cells comprising as an active ingredient the amino acid sequence of Claim 5.

16. An expression vector comprising the DNA of Claim 6.

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17. A pharmaceutical composition comprising the expression vector of Claim 16.
- ~~18.~~ A pharmaceutical composition comprising the anti-sense mRNA sequence of Claim 6.
- 5 19. A pharmaceutical composition according to Claim 17 or 18, for the treatment of cancer.
20. A pharmaceutical composition according to Claim 19 for the treatment of breast cancer.
21. A pharmaceutical composition according to Claim 17 or 18, for the
- 10 induction of abortion.
22. A method for the diagnosis of cancer comprising: detecting elevated to levels of mRNA transcribed from DNA sequences depicted in Fig. 1 or Fig. 4.
23. A method according to Claim 22, wherein the cancer is selected from
- 15 the group consisting of: breast cancer, hepatoblastoma, leukemia, Hodgkin's and non-Hodgkin's lymphomas and embryonal tumors.
24. A method for the detection of Down's Syndrome, comprising: detecting elevated levels of mRNA transcribed from the DNA sequence of Fig. 1 or 4.
- 20 25. A method for the detection of pathological pregnancies comprising detecting decreased levels of mRNA transcribed from the DNA sequence of Fig. 1 or 4.
26. A method according to Claim 25, wherein the pathological pregnancy is selected from the group consisting of: spontaneous abortion and
- 25 miscarriage, premature contractions, toxemia, premature delivery.
27. A method according to any one of Claims 22 to 26, wherein the level of the DNA expression is detected using RT-PCR.
28. A method for isolating the DNA sequence of Fig. 1 or 4, substantially as hereinbefore described.